



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

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④

D119-796-241TRN
Job Sheet 201876



Part No: D119-796-241TRN

Job Qty: 1 pcs

Part Name: Crosstube Turning Detail



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 10/16/19

Job Tracking No:

Due Date: 10/30/19

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG RD119-796 REV.K IPP REV A RQ 14/05/27 VERIFIED BY DD IPP REV:B 16.05.04 AS PER DWG REV.I
DD VERF:JLM

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Lead Time	DAS Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier			
100	Mori Seiki TL-40 - 1	1 pcs		10/30/19	1.00	1.72	Mori Seiki TL-40 - 1			662019/10/01 9-89
110	QC 2	1 pcs		10/30/19	0.00	0.00	QC 2 - 1			
							QC 2 - 12			
							QC 2 - 14			
							QC 2 - 17			
							QC 2 - 19			
							QC 2 - 2			
							QC 2 - 20			
							QC 2 - 22			
							QC 2 - 23			
							QC 2 - 25			
							QC 2 - 32			
							QC 2 - 33			
							QC 2 - 35			
							QC 2 - 39			
							QC 2 - 4			
							QC 2 - 40			
							QC 2 - 44			
							QC 2 - 45			
							QC 2 - 48			
							QC 2 - 49			
							QC 2 - 50			
							QC 2 - 51			
							QC 2 - 52			
							QC 2 - 57			
							QC 2 - 62			
							QC 2 - 63			
							QC 2 - 8			
							QC 2 - 66			
							QC 2 - 64			

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					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
120	Mori Seiki TL-40 - 1 - B4B	1 pcs	10/30/19	1.00 1.72	Mori Seiki TL-40 - 1 - B4B	DAS 66 9-89 2019/10/20
130	QC 2	1 pcs	10/30/19	0.00 0.00	QC 2 - 1	
					QC 2 - 12	
					QC 2 - 14	
					QC 2 - 17	
					QC 2 - 19	
					QC 2 - 2	
					QC 2 - 20	
					QC 2 - 22	
					QC 2 - 23	
					QC 2 - 25	
					QC 2 - 32	
					QC 2 - 33	
					QC 2 - 35	
					QC 2 - 39	
					QC 2 - 4	
					QC 2 - 40	
					QC 2 - 44	
					QC 2 - 45	
					QC 2 - 48	
					QC 2 - 49	
					QC 2 - 50	
					QC 2 - 51	
					QC 2 - 52	
					QC 2 - 57	
					QC 2 - 62	
					QC 2 - 63	
					QC 2 - 8	
					QC 2 - 66	DAS 66 9-89 2019/10/20
					QC 2 - 64	
					QC 2 - 65	
					QC 2 - 5	
					QC 2 - 71	
					QC 2 - 73	
					QC 2 - 69	
140	QC 8	1 pcs	10/30/19	0.00 0.00	QC 8 - 12	
					QC 8 - 14	
					QC 8 - 17	
					QC 8 - 20	
					QC 8 - 25	
					QC 8 - 3	
					QC 8 - 32	
					QC 8 - 33	
					QC 8 - 35	
					QC 8 - 39	
					QC 8 - 4	
					QC 8 - 44	
					QC 8 - 45	
					QC 8 - 49	
					QC 8 - 58	
					QC 8 - 8	
					QC 8 - 9	
					QC 8 - 68	

						QC 8 - 67	
						QC 8 - 1 (A)	
						QC 8 - 47	
						QC 8 - 40	
						QC 8 - 52	
						QC 8 - 23	
						QC 8 - 57	
						QC 8 - 76	DAS 76 9-89
						QC 8 - 61	
145	Crosstubes - 2 - B4B	1 pcs	10/30/19	0.00	0.45	Crosstubes - 1 - B4B	
						Crosstubes - 2 - B4B	
						Crosstubes - 3 - B4B	
						Crosstubes - 4 - B4B	
150	Handfinish - 1-1 Chemical-B4B	1 pcs	10/30/19	0.00	0.40	Handfinish - 1 - 1 - B4B	
						Handfinish - 1 - 2 - B4B	
						Handfinish - 1 - 3 - B4B	
						Handfinish - 1 - 4 - B4B	
						Handfinish - 1 - 5 - B4B	
						Handfinish - 1 - 6 - B4B	
						Handfinish - 1 - 7 - B4B	
						Handfinish - 1 - 8 - B4B	
						Handfinish - 1 - 9 - B4B	
						Handfinish - 1 - 10 - B4B	
						Handfinish - 1 - 11 - B4B	
						Handfinish - 1 - 12 - B4B	
						Handfinish - 1 - 13 - B4B	
						Handfinish - 1 - 14 - B4B	
						Handfinish - 1 - 15 - B4B	
						Handfinish - 1 - 16 - B4B	
						Handfinish - 1 - 17 - B4B	
						Handfinish - 1 - 18 - B4B	
						Handfinish - 1 - 19 - B4B	
						Handfinish - 1 - 20 - B4B	
						Handfinish - 1 - 21 - B4B	
						Handfinish - 1 - 22 - B4B	
160	QC 7	1 pcs	10/30/19	0.00	0.00	QC 7 - 10	
						QC 7 - 13	
						QC 7 - 14	
						QC 7 - 15	
						QC 7 - 17	
						QC 7 - 18	
						QC 7 - 19	
						QC 7 - 2	
						QC 7 - 28	
						QC 7 - 3	
						QC 7 - 30	
						QC 7 - 34	
						QC 7 - 36	

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					QC 7 - 37	
					QC 7 - 41	
					QC 7 - 47	
					QC 7 - 48	
					QC 7 - 51	
					QC 7 - 58	
					QC 7 - 59	
					QC 7 - 60	
					QC 7 - 9	
					QC 7 - 68	
					QC 7 - 50	
					QC 7 - 67	
					QC 7 - 40	
					QC 7 - 24	
					QC 7 - 43	DAS
					QC 7 - 61	76
					QC 7 - 81	9-89
					QC 7 - 76	
					QC 7 - 79	
170	Packaging 3-1 - Stock - B4B	1	10/30/19	0.00 0.00	Packaging 3 - 1 - B4B	
	pcs				Packaging 3 - 2 - B4B	
					Packaging 3 - 3 - B4B	
					Packaging 3 - 4 - B4B	
					Packaging 3 - 5 - B4B	
					Packaging 3 - 6 - B4B	
					Packaging 3 - 7 - B4B	
					Packaging 3 - 8 - B4B	
					Packaging 3 - 9 - B4B	
					Packaging 3 - 10 - B4B	
					Packaging 3 - 11 - B4B	
					Packaging 3 - 12 - B4B	
					Packaging 3 - 13 - B4B	
					Packaging 3 - 14 - B4B	
					Packaging 3 - 15 - B4B	
					Packaging 3 - 16 - B4B	
					Packaging 3 - 17 - B4B	
					Packaging 3 - 18 - B4B	
					Packaging 3 - 19 - B4B	
					Packaging 3 - 20 - B4B	
					Packaging 3 - 21 - B4B	
					Packaging 3 - 22 - B4B	
					Packaging 3 - 23 - B4B	
					Packaging 3 - 24 - B4B	BD 11/29/2019
					Packaging 3 - 25 - B4B	
					Packaging 3 - 26 - B4B	
					Packaging 3 - 27 - B4B	
					Packaging 3 - 28 - B4B	
					Packaging 3 - 29 - B4B	
					Packaging 3 - 30 - B4B	
					Packaging 3 - 31 - B4B	
					Packaging 3 - 32 - B4B	
					Packaging 3 - 33 - B4B	
					Packaging 3 - 34 - B4B	
					Packaging 3 - 35 - B4B	
					Packaging 3 - 36 - B4B	
180	QC 21 - FG	1	10/30/19	0.00 0.00	QC 21 - FG - 21	DAS
	pcs				QC 21 - FG - 70	21
					QC 21 - FG - 53	9-89
Part Op 100 - 1-Fill tube with sand & install plugs on both ends as per Folio FB298 2-Turn first side as per Folio FB298						

Descriptions: **110** - (QC2- Inspect parts off machine FAI/FAIB)
120 - 1-Turn second side as per Folio FB298
130 - (QC2- Inspect parts off machine FAI/FAIB)
140 - (QC8- Inspect parts - second check)
145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.
150 - 1- Handfinish X-TUBE INSIDE AND OUT. ALODINE AND ACID ETCH X-TUBE AS PER DWG . USE RED SCOTCH BRITE PAD.
160 - (QC7-Inspect Chemical Conversion Coat)
170 - (Identify as per dwg & Stock Location: _____) LOCATION : LG014
180 - (QC21- Final Inspection - Work Order Release)

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D6023-106	Crosstube Material	1 pcs (1 ea)	100-Mori Seiki TL-40 - 1	S013837

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
100-Mori Seiki TL-40 - 1	D6023-106	1	6	0

Part Specifications

Specifications could not be found.



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Container No: S224553**Part: D119-796-241TRN****Job No: 201876****Serial No/Batch: S224553****Revision: K****Inspector:****Exp Date:****Instructions:**

Date: 10/21/18

④

DART AEROSPACE LTD	Work Order: 201876
Description: Crosstube Assembly (AW119 MKII Aft)	Part Number: D119-796-241TRN
Inspection Dwg: D119-796-241 Rev: K	Page 1 of 2

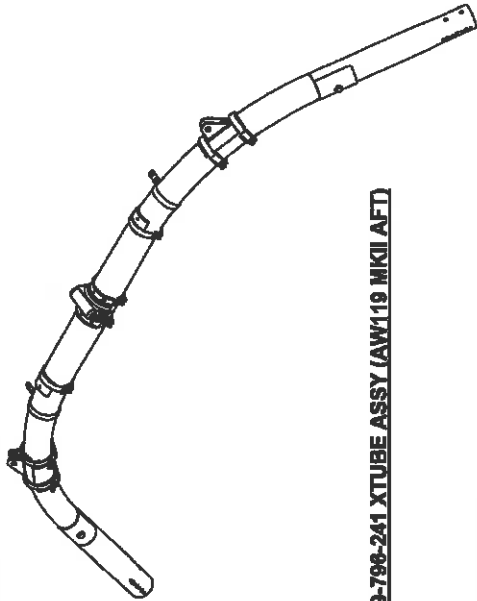
FIRST ARTICLE INSPECTION CHECKLIST

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	5.88	+/-0.030	5.889	✓		CNC-08	
	2.516	+0.005/-0.000	2.520	✓		CNC-04	
	2.626	+0.005/-0.000	2.631	✓			
	2.627	+0.005/-0.000	2.632	✓			
	2.798	+0.005/-0.000	2.803	✓			
	2.799	+0.005/-0.000	2.804	✓			
	2.989	+0.005/-0.000	2.994	✓			
	3.191	+0.005/-0.000	3.196	✓		CNC-05	
	3.200	+0.005/-0.000	3.205	✓		"	
SIDE B	5.88	+/-0.030	5.889	✓		CNC-08	
	2.516	+0.005/-0.000	2.521	✓		CNC-04	
	2.626	+0.005/-0.000	2.631	✓			
	2.627	+0.005/-0.000	2.632	✓			
	2.798	+0.005/-0.000	2.803	✓			
	2.799	+0.005/-0.000	2.804	✓			
	2.989	+0.005/-0.000	2.993	✓			
	3.191	+0.005/-0.000	3.196	✓		CNC-05	
	3.200	+0.005/-0.000	3.206	✓		"	
	105.71	+/-0.020	105.70				

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SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 261876 NCS

19-10-16

D1119-798-241 XTUBE ASSY (AW119 MKII AFT)



- NOTES:
- 1) MATERIAL: N/A
 - 2) FINISH: MASK D5134-041-042 DAMPER SUPPORT ASSEMBLIES, CUFFS, D5136-1-2 CONTACT PADS, THE COMPLETE CIRCUMFERENCE OF THE TUBE UNDER THE D5122-1 CENTER SUPPORT AND THE TAB ON THE D5151-1 GROUNDING CLAMP PRIOR TO APPLICATION OF CLEAR COAT PAINT.
IF NECESSARY TOUCH UP PRIMER ON OUTSIDE OF CROSSTUBE PER DART QSI 005 4.2.
APPLY MATTIE CLEAR COAT TO THE UNDERSIDE OF CROSSTUBE AS SHOWN (B4-2, HATCHED AREA) PER QSI 005 4.2.
MASK THE UNDERSIDE OF CROSSTUBE AS SHOWN (B4-2, HATCHED AREA).
PAINT OUTSIDE PER DART QSI 018 UNLESS OTHERWISE NOTED
 - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
 - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
 - 5) BREAK SHARP EDGES: N/A
 - 6) IDENTIFICATION: IDENTIFY USING PART NUMBER "D1119-798-241" AND BATCH NUMBER ON INSIDE OF CUFF PER QSI 044 6.4
 - 7) WEIGHT: 26.28 lbs
 - 8) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE.
THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM DEFECTS SUCH AS SCRATCHES, NICKS OR DENTS. DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
TAG TO INDICATE "D5122-1 CENTER SUPPORT MUST BE BONDED PER IN-D119-798 PRIOR TO FLIGHT".
 - 9) INSTALL D5122-1 CENTER SUPPORT HAND TIGHT ONLY. DO NOT TORQUE. INSTALL RED CROSSTUBE WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4106S WASH N' WIPE DEGREASER. APPLY A 0.100" MIN THK LAYER OF PROSEAL 880 ON THE INSIDE CONCAVE SURFACE OF THE D5136-1/2 CONTACT PADS AND INSTALL AT AN 8.4° OFFSET FROM THE CROSSTUBE BENDING PLANE. INSTALL MS21920-25 CLAMPS AND D5128-9 CLAMP CUSHIONS WHILE WET. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 880 SEALANT HAS CURED FOR 72 HOURS.
 - 10) TORQUE MS21920 CLAMPS 80 - 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY. THE NUT HAS NOT BOTTOMED-OUT AFTER TORQUING AND THE NUT IS FACING AFT.
 - 11) PRIOR TO FINISHING, POSITION AND INSTALL D5134-041-042 DAMPER SUPPORTS USING JIG DT10085. ABRAD MATING SURFACES OF THE D5134-041-042 DAMPER SUPPORTS AND CROSSTUBE WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4106S WASH N' WIPE DEGREASER. APPLY A 0.100" MIN THK LAYER OF PROSEAL 880 ON THE INSIDE CONCAVE SURFACE OF THE D5134-041-042. INSTALL MS21920-25 CLAMPS AND D5128-1 CLAMP CUSHIONS WHILE WET. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 880 SEALANT HAS CURED FOR 72 HOURS. ENSURE THAT THE MS21920 CLAMPS ARE POSITIONED AS SHOWN IN DETAIL C.
 - 12) PRIOR TO FINISHING, ABRAD MATING SURFACES OF CROSSTUBE AND D5152-043 WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4106S WASH N' WIPE DEGREASER. INSTALL D5152-043 USING TOOL DT10112
 - 13) LOCATE D5152-043 GROUNDING CLAMP AND ASSOCIATED HARDWARE PER DETAIL "C" PRIOR TO FINISHING. TORQUE THE MS21042-3 NUT 12-15 IN-LB. COMPLETELY SEAL THE CLAMP USING PROSEAL 880.
 - 14) CARRY OUT A RESISTANCE CHECK BETWEEN THE D5151-1 GROUNDING CLAMP AND ANY UNPAINTED SECTION OF THE CROSSTUBE IN ACCORDANCE WITH AC43-13-15 CHAPTER 11. MAXIMUM RESISTANCE IS 3 MILLIOHMS.

UNDER REVIEW
URF 18-798 19.07.04 (SAD)

RELEASED

2019 MAY 07
EOM R-793

APPROVED

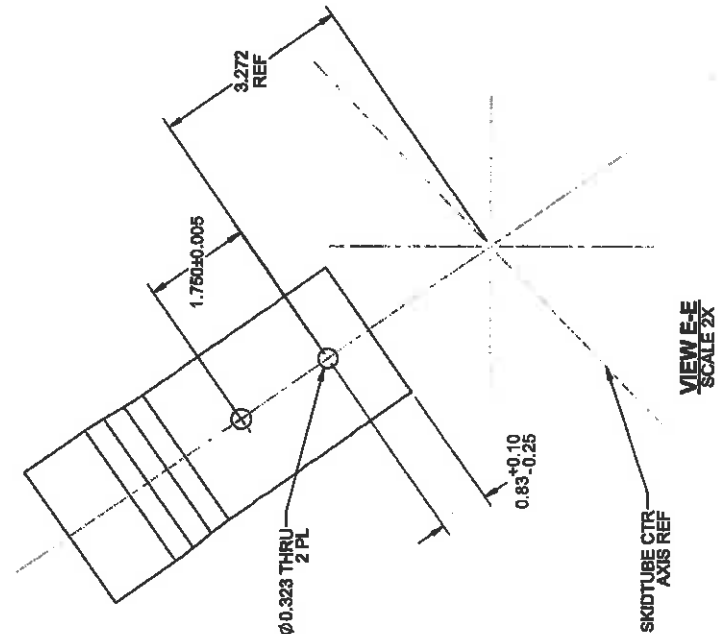
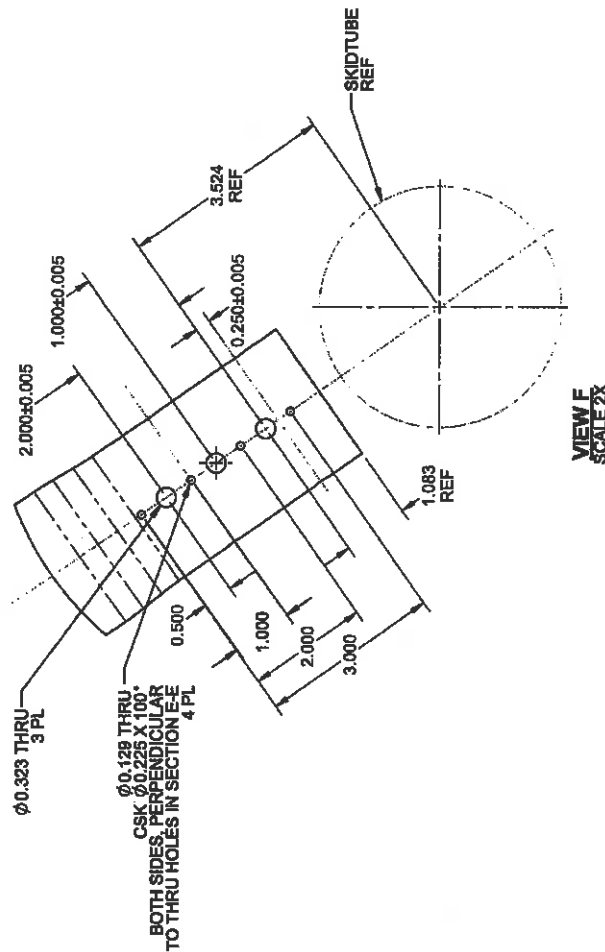
REV.	DESCRIPTION	BY	DATE
A	NEW ISSUE	AP	14.09.07
B	ORIENTATION OF D5122-1 CENTER SUPPORT WAS CORRECTED BY ADDING ANOTHER D5151-1 GROUNDING CLAMP TO THE ASSY & FOR LOCATING CUFF HOLES. RE-ORGANIZED NOTES. REMOVED REDUNDANT INFORMATION.	AP	14.09.08
C	CR3212-4-07 RIVETS WAS CR3212-4-05 RIVETS. RADIUS BLOCK WAS NOT PLATE ASSEMBLY. BOMA REMOVED 7.5 9760 CLAMP WAS OFFSET (A1-3) IN REDUCED CUFF DIA TO 2.500 (B4-6). ADD INSPECTION WINDOW	AP	14.10.23
D	ADD D5159-3 STEP POST (2X). MOVED INSPECTION WINDOW DETAIL TO SHT 1. MODIFIED NOTES ON SH 16.3	DB	14.11.25
E	D5152-043 WAS D5152-3. SCOTCH BRITE 7447 RED WAS 180 GRIT SANDPAPER	DB	15.01.15
F	REMOVED PRIMERPAINT ON CUFFS. 2.516 WAS 2.500 (B4-6)	AP	15.02.03
G	FINISHING ORDER ADJUSTED. UPDATE BEND TOLERANCE AND TRN DETAIL TOLERANCE TO MATCH D1119-798-141 DWG	AP	15.04.24
H	NOTE 9 RE-WRITTEN. BONDING INSTRUCTIONS MOVED TO JIN. SEE PREVIOUS REV FOR DETAILS.	AP	15.07.02
I	D5123-106 MATERIAL REPLACES D5009-106. D5136-1/2 & D5134-041-042 NOW INSTALLED ON PRIMER.	AP	15.10.13
J	ADD NOTE 14.1 IS ON SHT 1. ADD PRIMER MASKING LOCATIONS. REVISE NOTES ON SHT 1 & 4. REVISE BOM ON SHT 2 TO ADD GROUNDING CLAMP AND ASSOCIATED HARDWARE. REF PAR 17-680	ML	17.02.10
K	CHANGE LOCATION AND ORIENTATION OF D5151-1 GROUNDING CLAMP. REF PAR 15-222	MW	18.09.19

DESIGN	AP	DATE	18.09.19
DRAWN	MW	BY	AP
CHECKED	JF	DATE	14.09.07
MFG APPR	ZP	DATE	14.09.07
APPROVED	NO	DATE	14.09.07
DE APPR	CP	DATE	14.09.07

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA
DRAWING NO. D1119-798-241
REV. K
SHEET 1 OF 7
XTUBE ASSY (AW119 MKII AFT)
SCALE
NTS
COMPONENT IS 304L BY DART AEROSPACE LTD
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1 2 3 4 5 6 7 8

D C B A



UNDER REVIEW
URF 19-799 19.07.04 (SAD)

RELEASED
2019 MAY 07

DESIGN	AP	MIN	REV. K
DRAWN	MIN	REV. K	
CHECKED	ZF	DRAWING NO.	D119-796-241
MFG. APPR.	JFS	TITLE	XTUBE ASSY (AW119 MKII AFT)
APPROVED	NO	SHEET 8 OF 7	NTS
DE APPR.	CP	SCALE	
DATE	18.09.19		

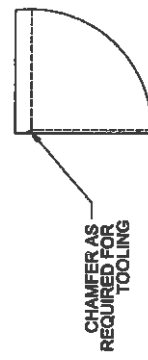
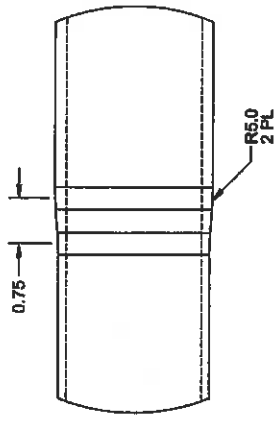
APPROVED

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D C B A

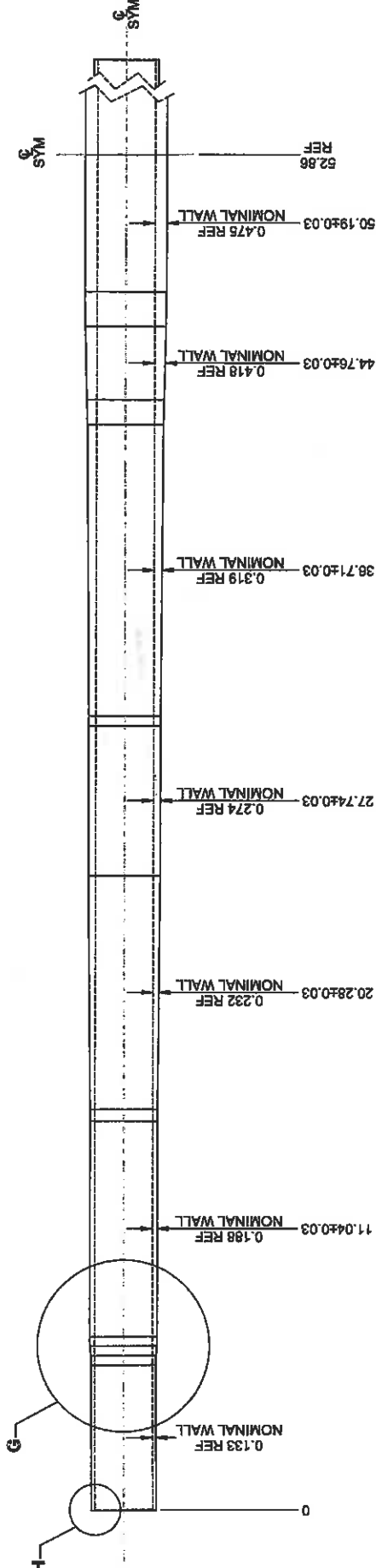
1 2 3 4 5 6 7 8

D C B A



DETAIL H
SCALE 4X

DETAIL G
SCALE 2X



UNDER REVIEW
URF 19-799 19.07.04 (SAD)

D119-798-241 TRN CROSS TUBE, AFT
SUPPLEMENTAL VIEW: NOMINAL WALL THICKNESS

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2019 MAY 07

DESIGN	AP	MW	ZF	JFS	NO	CP	DATE	18.09.19
DRAWN								
CHECKED								
ENG. APPR.								
APPROVED								
DE APPR.								

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA
DRAWING NO.
D119-798-241
SHEET 7 OF 7
SCALE
XTUBE ASSY (AW119 MKII AFT)
NTS
DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA
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Entered: _____ Date: _____

WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

Route update only

NCR No. _____

Job: _____

Part No. _____

DISPOSITION

Rework ☐
Scrap ☐
Use-as-is ☐

DEPARTMENT/PROCESS

Cross tube ☐
Small Fab ☐
Finishing ☐
Skid-tube ☐
Machining ☐
Large Fab ☐
Eng. (Non-AW) ☐
Prod. Eng. Coord. ☐
Rec/Store/Packaging ☐

Engineering ☐
Water Jet ☐
Supplier ☐
Quality ☐

Date: _____

Sequence #: _____

QTY Affected: _____

MRB (QS1042)

Description Work Order Deviation

Disposition

Completed By _____

Lead hand / Supervisor _____

QC / QA Coordinator _____

Root Cause

Operator ☐
Manufacturing Process ☐
Equip/Tooling ☐
Handling/Preservation ☐
Material ☐
Product Improvement ☐
Process Improvement ☐
Human Factors ☐

FAULT CATEGORY

Pressure/Forced	Contamination	Power Loss/Surge	Positioned Wrong
Bending	Misaligned/off center	Folio/Program	Outside Tolerance
Crushing	BOM/Route	Grain Direction	Drawing
Cracks	Broken/Damage/Defect	Weld	Finish
Crimp/Kink/Ripple/Wave/Twist	Incomplete/Unclear Instructions	Wrong Stock Pulled	Part Lost/Missing
Marks/Chatter	Drill Holes	Out of Sequence	Misread
Mislabeled	Fit/Function	Off-set/Set-up	

Other/Details: _____